



Descriptive Report and Test Results

MASTER CONTRACT: 264899
REPORT: 70043793
PROJECT: 80042848

Edition 1: September 16, 2015; Project 70043793 – Guangzhou
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Edition 2: November 2, 2020; Project 80042848 - Toronto
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Report pages reissued. Attachments replaced.

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PRODUCTS

CLASS - C907330 - ELECTRONIC COMPONENTS Optoisolators and non-optical isolating devices

Component Acceptance of Optoisolators

Device (DIP4, SMD4 or LSOP4)	Ratings		Standard/Notice and Clauses	Internal		External
	kV	°C		Creepage (mm)	Dist Thru (mm)	Creep/Clear (mm)
UPC610 UPC814 UPC815 UPC816 UPC817 UPC851 UPC852 UPC2501 UPC10xx	5.0	110	CSA 62368-1-19 5.4.3, 5.4.2, 5.4.4.4, 5.4.7, 5.4.8, 5.4.1.5.3, 5.4.9.1, 5.4.1.4	DIP4, SMD4 5.8 LSOP4 4.9	DIP4, SMD4 0.7 LSOP4 0.8	DIP4, SMD4 7.6 LSOP4 8.0

where xx is a 2 digit suffix for current transfer ratio for UPC10 while others may have a single letter suffix for current transfer ratio. Suffix L for lead free or G for halogen free may be used. Suffix C, D or L followed by 04 and then blank, C or M indicates package type. Final suffix R or T may be used for reel or tube shipping package.

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Notes:

1. The devices meet basic insulation requirements with the DIP4 and SMD4 for 760Vrms and the LSOP4 devices for 800Vrms for CSA 62368-1:19. (pollution degree 2, material group III)
2. The devices meet reinforced insulation requirements with the DIP4 and SMD4 for 330Vrms and the LSOP4 devices for 400Vrms for CSA 62368-1:19. (pollution degree 2, material group III)
3. Evaluated by thermal cycling for a temperature rating of 125C.
4. The creepage and clearance has been evaluated for altitudes $\leq 2000\text{m}$, in pollution degree 2 and overvoltage category II except where specified above. (pollution degree 2, material group III).

These devices are Component Accepted as components for use in other Certified equipment where the suitability of the combination shall be determined by investigation in the final application.

APPLICABLE REQUIREMENTS

CAN/CSA-C22.2 No. 62368-1:19 - Audio/video, information and communication technology equipment - Part 1: Safety requirements (Bi-national Standard with ANSI/UL 62368-1-2019)

MARKINGS

The manufacturer is required to apply the following markings:

- Products shall be marked with the markings specified by the particular product standard.
- Products certified for Canada shall have all Caution and Warning markings in both English and French.

Additional bilingual markings not covered by the product standard(s) may be required by the Authorities Having Jurisdiction. It is the responsibility of the manufacturer to provide and apply these additional markings, where applicable, in accordance with the requirements of those authorities.

The products listed are eligible to bear the CSA Mark, without any adjacent indicators, indicating that products have been manufactured to the requirements of Canadian Standards.

The following permanent markings are on each component:



Example in photos:

- submittor's identification: CSA registered Trademark "UTC" or "FSMC" followed by a 4 letter date code
- model designation: UPC1010G or as appropriate
- date code: 4 letters or digits except I and O: 1st is a letter representing last digit of year, N=0 to W=9
2nd is a letter representing month, A-1 to M=12
3rd is a letter representing production line A to Z
4th is a number or letter representing the day of the month, 1 to 9 then A to X for 10 to 31
- CSA Component Acceptance Mark may also be marked.

The following is marked on smallest quantity package:



Example in photos:

- submittor's name, or CSA Master Contract No. "264899" or CSA registered Trademark "UTC" or "FSMC" followed by the part number;
- model designation; UPC1010G or as appropriate for the model
- CSA Component Acceptance Mark.

ALTERATIONS

Markings as above.

FACTORY TESTS

The opto-isolator shall withstand without flash-over or breakdown, for a period of 1s, an ac voltage equal to the manufacturer's 1 minute dielectric withstand rating, with a minimum of 5000V, applied between the short-circuited input and short-circuited output terminals.

Warning: The factory test(s) specified may present a hazard of injury to personnel and/or property and should only be performed by persons knowledgeable of such hazards and under conditions designed to minimize the possibility of injury.

SPECIAL INSTRUCTIONS FOR FIELD SERVICES N/A

1. Component descriptions marked with either the "(INT)" or "(INT*)" identifiers may be substituted with other components providing the requirements specified under the notes in the "Description" are complied with.

COMPONENT SPECIAL PICKUP N/A

1. Component descriptions marked with the identifier "(CT)" are subject to annual pickup and Conformity Testing.

DESCRIPTION

Notes: N/A

1. Component Substitution
 - a) Critical components (those identified by mfr name, cat no), which are NOT identified with either "INT" or "INT*" are not eligible for substitution without evaluation and report updating
 - b) The term "INT" means a "Certified" and/or "Listed" (or a "Recognized" and/or "Accepted") component may be replaced by one "Certified" and/or "Listed" by another certification organization accredited by the appropriate accreditation body or scheme requirements to the correct standard, for the same application; providing the applicable country identifiers are included and requirements in item "d" below are complied with.

- c) The Term "(INT*)" means a "Recognized" and/or "Accepted" component may be replaced by a component that is CSA Certified. The applicable country identifiers shall be included, the requirements in item "d" below as well as any "conditions of suitability" for the component (as recorded in this descriptive report) shall be complied with;
- d) Components which have been substituted, must be of an equivalent rating, configuration (size, orientation, mounting) and the applicable minimum creepage and clearance distances are to be maintained from live parts to bonded metal parts and secondary parts.
- e) Substitution of a "Certified" and/or "Listed" component with a component that is "Recognized" or "Accepted" is not permitted without evaluation and report updating.
- f) Substitution of a "Recognized" and/or "Accepted" component by one that is not CSA Certified is not permitted without a proper evaluation as well as a report update because the Conditions of Acceptance of the original component may be different than the Conditions of Acceptance of the substitute component.

General: The above optoisolators use inner and outer mould compounds and non-coplanar construction.

1. Case (Outer Compound) – CUR, UR:

Material: Epoxy

Manufacturer: Beijing Sino-Tech Electronic Materials Co. Ltd. (E302746)

Cat No: 1. TH-2400

Cat No: 2. TH-G

2. Inner Compound – CUR, UR:

Material: Epoxy

Manufacturer: Beijing Sino-Tech Electronic Materials Co. Ltd. (E302746)

Cat No: TH-2100

Possible outer/inner moulding compound combinations are TH-G/TH-2100 and TH-2400/TH-2100.

3. LED Coating:

Material: Silicone

Manufacturer: Beijing KMT Technology Co.,Ltd

Cat No: KMT-1171

4. Lead frame: LSOP4 package: CU alloy with Ag plating.

SMD4 and DIP4: Fe alloy with Ag plating or CU alloy with Ag plating.

5. External Creepage Distance: DIP4, SMD4 7.6mm; LSOP4 8.0mm

External distance between isolated pins: DIP4 7.6mm; LSOP4 8.9mm (measured -depends on lead bending)

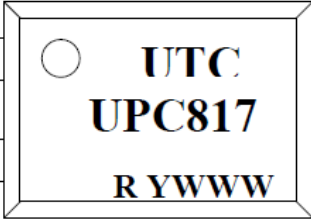
Construction Review Summary - only the following applicable evaluations to the IEC standards or corresponding EN or CSA standards were performed

Evaluation	Clause of Standard/Notice	Verdict
	CSA 62368-1:2019	
Creep	5.4.3	P
Clear	5.4.2	P
Distance through	5.4.4.2 or evaluated by 5.4.4.4, 5.4.7	P
Thermal cycling	5.4.1.5.3, 5.4.7	P
Humidity	4.5.8 5days (tropical) or covered by samples in thermal cycling	P
Dielectric after thermal cycling	5.4.9.1x1.6	P
Temperature/Dissipation test	5.4.1.4	P
Dielectric after Dissipation test	5.4.9.1	P
Defibrillation Proof test	N/A	N/A
IEC 60112 evaluation and material classification	5.4.3.3	N/A

TEST HISTORY

Project 70043793 (Edition 1): Note: the construction evaluated in project 70043793 is no longer used. The test data for Project 70043793 (Edition 1) is not applicable to the current construction but is kept on file for reference.

Model UPC817.

Manufacturer	Fujian Fushun Semiconductor Manufacture Co., Ltd.	
Cat. No.	UPC 817	
Description	50 mA Output current IGBT Gate Driver Optocoupler	
Package	4 pin	
Markings		UPC 817
Number of Test Samples	5 samples	

Manufacturers Maximum Ratings:

Input power Dissipation (Pi)	70 mW
Output Collector power Dissipation (Po)	150 mW
Total power dissipation (PT)	220 mW
Input Forward Voltage (VF)	1.2 V
Input Forward Current (IF)	50 mA
Output Supply Voltage (VCC)	35 V
Output Current Peak (IO)	50 mA
Temperature	110°C
Dielectric strength	5000Vac

1. Dielectric Strength test before maximum dissipation test:

Location	Voltage (Vac/dc)	Frequency (Hz)	Duration (s)	Verdict (Pass/Fail)
Input pins to output pins	5000Vac	60	60	Pass
Test Equipment: JV60052				
Test Date: 2015-07-02				

2. Maximum Power Dissipation Test





Input power $P_I = V_F * I_F$ (mW)	63.36 mW (1.25 V * 50.69 mA)
Output power $P_O = (V_{CC} - V_O) * I_O$	245.75mW (4.85V * 50.67 mA)
Total power dissipation: $P_T = P_I + P_O$	309.11mW
Input Forward Voltage (VF) and current (IF)	1.25 V, 50.69 mA
Output Supply Voltage (VCC)	15.95
Output Voltage (VO) and current (IO)	4.85 V and 50.67 mA
Temperature	110°C
Test Equipment: JV60014, JV60019, JV60115	
Test Date: 2015-07-02 to 2015-07-03	

3. Dielectric test after maximum dissipation test:

Location	Voltage (Vac/dc)	Frequency (Hz)	Duration (s)	Verdict (Pass/Fail)
Input pins to output pins	5000Vac	60	60	Pass

Project 80042848: Update for CSA 62368-1:19 and change of construction for UPC817 and addition of models UPC610, UPC814, UPC815, UPC816, UPC851, UPC852, UPC2501 and UPC10xx. Previous tests no longer apply and are not representative of the current construction.

Samples of model UPC852 DIP4 with outer/inner moulding compound combination TH-2400/TH-2100 and TH-G/TH-2100 and samples of UPC852 LSOP4 with outer/inner moulding compound combination TH-2400/TH-2100 and TH-G/TH-2100 were tested. These samples represent the current construction for all models.

Manufacturer	Fujian Fushun Semiconductor Manufacturing Co., Ltd	
Cat. No.	1 - UPC852 DIP4 with outer/inner moulding compound combination TH-2400/TH-2100 2 - UPC852 LSOP4 with outer/inner moulding compound combination TH-2400/TH-2100 3 - UPC852 DIP4 with outer/inner moulding compound combination TH-G/TH-2100 4 - UPC852 LSOP4 with outer/inner moulding compound combination TH-G/TH-2100	
Description	Opto isolator	
Package	DIP-4 and LSOP-4	
Markings	 1 - UPC852 DIP4 with outer/inner moulding compound combination TH-2400/TH-2100	 2- UPC852 LSOP4 with outer/inner moulding compound combination TH-2400/TH-2100
	 UPC852 DIP4 with outer/inner moulding compound combination TH-G/TH-2100	 4 - UPC852 LSOP4 with outer/inner moulding compound combination TH-G/TH-2100
Number of Test Samples	5 of each type.	

Manufacturers Maximum Ratings:

Input power Dissipation (P _{IN})	100mW
Output power Dissipation (P _{OUT})	300mW
Total power dissipation (P _T = P _{IN} + P _{OUT})	320mW
Input Forward Bias Voltage (V _F)	1.40V
Input Forward bias current (I _F)	60mA
Output Collector – Emitter Voltage (V _{CE})	350V
Output Collector Current (I _C)	150mA
Temperature	110°C
Dielectric strength	5000V _{rms}

1. Dielectric Strength test before maximum dissipation test:

Part	Location	Voltage (Vac/dc)	Frequency (Hz)	Duration (s)	Verdict (Pass/Fail)
1 - UPC852 DIP4 with outer/inner moulding compound combinations TH-2400/TH-2100	Input pins to Output pins	5000Vac	60	60	Pass
2- UPC852 LSOP4 with outer/inner moulding compound combinations TH-2400/TH-2100	Input pins to Output pins	5000Vac	60	60	Pass
3- UPC852 DIP4 with outer/inner moulding compound combinations TH-G/TH-2100	Input pins to Output pins	5000Vac	60	60	Pass
4- UPC852 LSOP4 with outer/inner moulding compound combinations TH-G/TH-2100	Input pins to Output pins	5000Vac	60	60	Pass

2. Maximum Power Dissipation Test

1 - UPC852 DIP4 with outer/inner moulding compound combination TH-2400/TH-2100	
Input power ($P_{IN} = V_F \times I_F$)	78.6mW
Output power ($P_{OUT} = V_{CE} \times I_C$)	303.4mW
Total power dissipation: $P_T = P_{IN} + P_{OUT}$	382.0mW
Input Forward Bias Voltage and Current (V_F, I_F)	1.31V, 60mA
Output Supply Voltage and Current (V_{CC}, I_{CC})	8.3V, 41mA
Output collector to emitter voltage (V_{CE})	7.4V
Output Load Voltage (V_{RO})	0.9V
Output collector current (I_C)	41mA
IC surface temperature	133°C
Ambient Temperature	111°C
Test Time	4 hours

2- UPC852 LSOP4 with outer/inner moulding compound combination TH-2400/TH-2100	
Input power ($P_{IN} = V_F \times I_F$)	79.2mW
Output power ($P_{OUT} = V_{CE} \times I_C$)	304.6mW
Total power dissipation: $P_T = P_{IN} + P_{OUT}$	383.8mW
Input Forward Bias Voltage and Current (V_F, I_F)	1.32V, 60mA
Output Supply Voltage and Current (V_{CC}, I_{CC})	8.7V, 38.7mA
Output collector to emitter voltage (V_{CE})	7.87V
Output Load Voltage (V_{RO})	0.83V
Output collector current (I_C)	38.7mA
IC surface temperature	130°C
Ambient Temperature	111°C
Test Time	4 hours

3- UPC852 DIP4 with outer/inner moulding compound combination TH-G/TH-2100	
Input power ($P_{IN} = V_F \times I_F$)	78.6mW
Output power ($P_{OUT} = V_{CE} \times I_C$)	308.6mW
Total power dissipation: $P_T = P_{IN} + P_{OUT}$	387.2mW
Input Forward Bias Voltage and Current (V_F, I_F)	1.31V, 60mA
Output Supply Voltage and Current (V_{CC}, I_{CC})	8.3V, 41.7mA
Output collector to emitter voltage (V_{CE})	7.4V
Output Load Voltage (V_{RO})	0.9V
Output collector current (I_C)	41.7mA
IC surface temperature	140°C
Ambient Temperature	111°C
Test Time	4 hours

4- UPC852 LSOP4 with outer/inner moulding compound combination TH-G/TH-2100	
Input power ($P_{IN} = V_F \times I_F$)	76.8mW
Output power ($P_{OUT} = V_{CE} \times I_C$)	301.2mW
Total power dissipation: $P_T = P_{IN} + P_{OUT}$	378mW
Input Forward Bias Voltage and Current (V_F, I_F)	1.28V, 60mA
Output Supply Voltage and Current (V_{CC}, I_{CC})	8.0V, 42.6mA
Output collector to emitter voltage (V_{CE})	7.07V
Output Load Voltage (V_{RO})	0.93V
Output collector current (I_C)	42.6mA
IC surface temperature	129°C
Ambient Temperature	111°C
Test Time	4 hours

3. Dielectric test after maximum dissipation test:

Part	Location	Voltage (Vac/dc)	Frequency (Hz)	Duration (s)	Verdict (Pass/Fail)
1 - UPC852 DIP4 with outer/inner moulding compound combination TH-2400/TH-2100	Input pins to Output pins	5000Vac	60	60	Pass
2- UPC852 LSOP4 with outer/inner moulding compound combination TH-2400/TH-2100	Input pins to Output pins	5000Vac	60	60	Pass
3- UPC852 DIP4 with outer/inner moulding compound combination TH-G/TH-2100	Input pins to Output pins	5000Vac	60	60	Pass
4- UPC852 LSOP4 with outer/inner moulding compound combination TH-G/TH-2100	Input pins to Output pins	5000Vac	60	60	Pass

Thermal Cycling and Dielectric Tests CSA 62368-1-19 Cl 5.4.1.5.3 and 5.4.7 referenced by 5.4.4.4

1. UPC852 DIP4 with outer/inner moulding compound combination TH-2400/TH-2100
2. UPC852 LSOP4 with outer/inner moulding compound combination TH-2400/TH-2100
3. UPC852 DIP4 with outer/inner moulding compound combination TH-G/TH-2100
4. UPC852 LSOP4 with outer/inner moulding compound combination TH-G/TH-2100

1 sample of each of the samples listed above was subjected to 10 cycles of the following cycling while applying 500V, 60Hz, 60s:

68h at 135C
 1h at 25C
 2h at 0C
 not less than 1h at 25C

After cycling, the sample passed a dielectric test of 4526Vrms, 4800Vrms, 5000Vrms, 5657Vrms, 6400Vrms, 6789Vrms, 7241Vrms, 8640Vrms, and 9051Vrms 60Hz, 60s.

2 more samples each of the samples listed above were subjected to the cycling above and subsequently the 2 samples were conditioned at 93±3%, RH, 40±2C, for 120h and passed a dielectric test of 4526Vrms, 4800Vrms, 5000Vrms, 5657Vrms, 6400Vrms, 6789Vrms, 7241Vrms, 8640Vrms, and 9051Vrms 60Hz, 60s.

No voids or cracks were found in the samples after examination.

Construction Review:

Construction review performed with satisfactory results.

This Edition supersedes all previous editions.

---End of Report---